

The Clean Air Act (CAA) and National Ambient Air Quality Standards (NAAQS)

The Clean Air Act (CAA) was originally enacted in 1963 and last amended in 1990. It identifies specific pollutants that are harmful to human health or the environment (plants, animals, etc.) and regulates them through health-based standards or technology-based standards. Implementation of the CAA is divided among the federal, state, and local governments and each enforces violations of the Act that they are responsible for.

Health-Based Standards. There are six pollutants in this category (ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide, particulate matter, and lead) which are known as “criteria pollutants” since they were established based on human health criteria. There is a national ambient air quality standard (NAAQS) for each. This means that if the concentration of a pollutant is above a certain level (e.g. 150Fg/m³ of particulate matter with a diameter less than 10 microns [PM₁₀]) *anywhere* in the air we breathe, it is considered unhealthy and exceeds the NAAQS. Criteria pollutants are measured using a network of hundreds of monitors nationwide. About two dozen monitoring sites are located in Utah, mostly around the Wasatch Front where pollution is the greatest. Areas that violate the NAAQS are designated as nonattainment areas due to their failure to “attain” the NAAQS. Historically, this has been done on a county or municipality basis in Utah. Implementation of the NAAQS in Utah has been delegated to the state by EPA.

Current nonattainment areas in Utah are: PM₁₀ - Salt Lake and Utah Counties and Ogden city; SO₂ - Salt Lake County and parts of Tooele County; and CO - Provo, Orem and Ogden. Salt Lake and Davis Counties are designated as “maintenance areas” for ozone since they were previously nonattainment, but were able to achieve the NAAQS and be redesignated to attainment. Salt Lake City is a maintenance area for CO. Lead has been almost eliminated as an air pollutant due to the conversion to unleaded fuels.

When an area violates a NAAQS, the state must develop a state implementation plan (SIP) to achieve the standard. Generally, a SIP will describe a system of pollution control measures to reduce emissions of the pollutant of concern. In some cases pollutants that react to form a criteria pollutant are also regulated, such as nitrogen oxides and volatile organic compounds which react to form ozone. Examples of controls here in Utah include: Restricted wood stove use during periods of elevated PM; vehicle inspection and maintenance programs for CO, SO₂, NO_x, and volatile organics; sulfur reduction units at refineries; and low volatile organic compound (VOC) paint to reduce ozone. In addition, a strict permitting program (New Source Review) is implemented for industrial sources of pollution in non-attainment areas. There is also a permitting program for large industrial sources that applies in attainment areas (Prevention of Significant Deterioration). The goal of this program is to keep those areas clean, rather than delaying action until the air no longer meets health standards. Utah also requires permits for smaller sources in attainment areas if they are just starting operations or modifying their facility.

Visibility. Visibility in our national parks and wilderness areas has been regulated since 1977. Large industrial sources were regulated if their emission plume directly affected a park or wilderness area. The 1990 CAA amendments and subsequent federal regulations shifted the focus to regional haze which is caused by numerous emission sources, including urban smog. The Western Regional Air Partnership was formed in 1997 to develop regional strategies to improve visibility in the west. A

regional approach is important because visibility is affected by emission sources hundreds of miles away.

Hazardous Air Pollutants (HAPs). The second major group of pollutants regulated by the CAA are the HAPs. This consists of 188 substances listed in the 1990 act that include organics such as benzene, acids like HCl, and metal compounds such as mercury, arsenic, selenium and beryllium. HAPs are controlled with technology-based standards applied to specific industry groups that emit significant amounts of one or more HAPs. There are no standards for HAPs in ambient air and a national monitoring system is just being implemented. So far, almost 200 industry categories have been listed for HAP regulations which are called MACT standards (maximum achievable control technology). MACTs important in Utah apply to refineries, dry cleaners, aerospace manufacturers, and solvent-based painting for wood and metal products. Utah has been delegated authority to implement the HAP program by EPA.

Motor Vehicle Pollutants. Emissions from vehicles and other internal combustion engines consist of both criteria pollutants (CO, SO₂ and the ozone-precursors NO_x and VOC) and HAPs (benzene, aldehydes). The federal government is responsible for vehicle emission standards in most states with the notable exception of California which has its own, more rigorous standards. State and local governments are responsible for ensuring the vehicle emission control systems continue to meet federal standards through inspection and maintenance (I/M) programs. Salt Lake, Davis, Utah, and Weber Counties all have I/M programs and each is different. The state provides technical assistance and coordination only.

Acid Rain. This was a new program in the 1990 CAA to reduce acid deposition on forests and lakes that damages sensitive plants and wildlife. The most severe problems appeared in eastern North America and central Europe as a result of SO₂ and NO_x emissions from coal-fired power plants that were transported great distances and deposited as acids when mixed with atmospheric moisture. The two pollutants regulated by the Acid Rain program are criteria pollutants that have NAAQS, but the health standards were not able to address this specific problem that involved long range transport of pollutants. Reductions in SO₂ emissions from power plants are being achieved using a “market-based” program in which plants are allocated pollution credits that they can use or sell if they “over control” and have excess credits. Plants that pollute more than they have credits must buy more credits. The number of credits available nation-wide is reduced as years go by so overall pollution goes down. NO_x emissions are controlled by a traditional stack emission limit rather than a market program. Responsibility for the Acid Rain program is shared by state and federal governments. Utah issues Acid Rain permits to power plants, but enforcement actions in case of violations is largely in the hands of EPA.

Stratospheric Ozone Depletion. Ozone at ground level is harmful when inhaled, but the ozone that is present at high altitude in the stratosphere intercepts high energy ultraviolet light from the sun that can cause skin cancer if it gets through to humans on the ground. A number of years ago, researchers discovered that our stratospheric ozone was being depleted. The culprit turned out to be a class of synthetic compounds called chlorofluorocarbons (CFCs) that are highly stable and had many uses, principally as refrigerants, fire retardants, and cleaners for electronic components. Unfortunately, these

substances eventually made their way to the upper atmosphere. The high energy UV radiation there broke down the normally stable CFCs which then reacted with ozone and eliminated it from the stratosphere. As a result, the CAA of 1990 initiated a program to gradually eliminate CFCs. Similar regulations have been adopted by most countries since this is a global problem. This program is implemented entirely by the federal government.

Summary. The CAA is structured to regulate specific pollutants that harm human health or damage our environment. The pollutants and standards used to regulate them are quite specific and the powers vested in the federal, state, and local government are limited accordingly. The CAA does not regulate indoor air, odors, or noise.